"Streams of Data"

Adapted from Discover a Watershed: Watershed Manager (International Project WET, 2002)

Virginia Science SOLs

6.5, 6.7.6.9, LS.12

Setting

Classroom

Summary

Students create a pictorial representation of the geographical features, historical land uses and environmental issues of their selected watershed. Depending upon the amount of time devoted to the research portion, this lesson can take one-two class periods.

Learning Objectives

Students will:

1. synthesize a variety of different types of information and data representative of a sub-watershed.
2. compare.

Background Information

Every river is a complex and intriguing mix of elements. From headwaters to mouth, rivers are complex natural systems, connecting people to the land and plants and animals to their habitat. Numerical data, such as flow rate, dissolved oxygen and pH tell us one part of a river's story. The nature of its bedrock and soils, the activities of the people who inhabit its watershed and the patterns exhibited by wildlife paint a richer more vivid picture. People living near a river know its cycles through each year, each decade and in cases a human life time. During a recent drought, octogenarians living in the Virginia Piedmont and Blue Ridge witnessed the rivers they had known since childhood, run dry for the first time.

One way of investigating a river system is to learn more about the cities and towns along its path, their location, elevation, weather patterns and micro-climate, history, population, major industries and transportation routes. It's also important to note whether a particular town or city draws water from the river for their municipal water supply and if a waste water treatment facility is located there. For example, as of 2010, there are 18 regulated stream and river discharge sites in Hanover County and 16 in Caroline County. These numbers include not only wastewater treatment facilities but business, schools and other institutions. The discharges are periodically monitored for the most common types of water pollution. River stretches in rural areas can also be impacted when water is taken for irrigation and returned from orchards and crop fields through a network of ditches. Possible sources of information on specific river systems include: river associations and friends groups, the town, city or county's homepage, planning or public utilities departments, local realtors' homepages, Virginia gazetteer, www.virginiaplaces.org, www.deq.virginia.gov/water/homepage.html, www.worldclimate.com and www.randmcnally.com.

Materials

Banner paper, markers or crayons, Virginia gazetteer and/or Virginia highway maps, series of fact sheets from the on-line fairgrounds curriculum

Procedure

1. Begin with a discussion on the development of urban centers on waterways. Many of today's major cities began as centers for transportation, trade and agriculture supported by fertile river valley soils. At the onset of the industrial age, a consistent water supply was needed for factories and other businesses. Ask students to name major cities in the United States and list them on the board. Then ask them if they know the names of rivers (or bays or lakes) on whose shores many of these cities are located. Possibilities include: New York (Hudson River,) Baltimore (Chesapeake Bay,) Washington D.C. (Potomac River,) Chicago (Lake Michigan,) Seattle (Puget Sound,) Portland, OR (Columbia River,) New Orleans, St. Louis and Minneapolis – St. Paul (Mississippi River)

2. Narrow the discussion by turning the attention to the state of Virginia and review material the students should have first been exposed to in fourth grade, namely that many cities developed near the fall lines of major tributaries of the Chesapeake Bay. Examples, include Richmond on the James River, Fredericksburg on the Rappahannock and Washington D.C. just downstream of the Falls of the Potomac. Explain to the students, that we will now focus on the local portions of the James and York River watersheds.

3. Divide the class into small groups of approximately 4-5 students. (These can be the same teams that will be working together on the field day at the fairgrounds.) Assign each group one of the following rivers: North Anna, Pamunkey, Mattaponi River, York, Chickahominy and James, and explain that they will be creating a pictorial representation of their assigned river's watershed. Provide the fact sheets accompanying this lesson and review other possible sources of information with the students.

4. Ask each group to review their respective fact sheets, identify the route of the main waterway on a map and to try to produce its general shape on a sheet of banner paper. Total length, tributaries and other major geographical features, cities and towns should be noted.

5. The small groups' pictorial representations (called "Streamers") should also include information of symbolic representation of historical land uses and current environmental concerns.

6. Each small group concludes the activity with sharing their Streamer and what information they generated through an oral presentation to the rest of the class.

7. Debriefing questions may include: Which river system or sub-watershed do you feel is most economically valuable? historically relevant? ecologically sensitive?

Assessment

Individual student's participation level in class discussion and the small group work, as well as the overall quality of the graphic and oral presentation can be evaluated.